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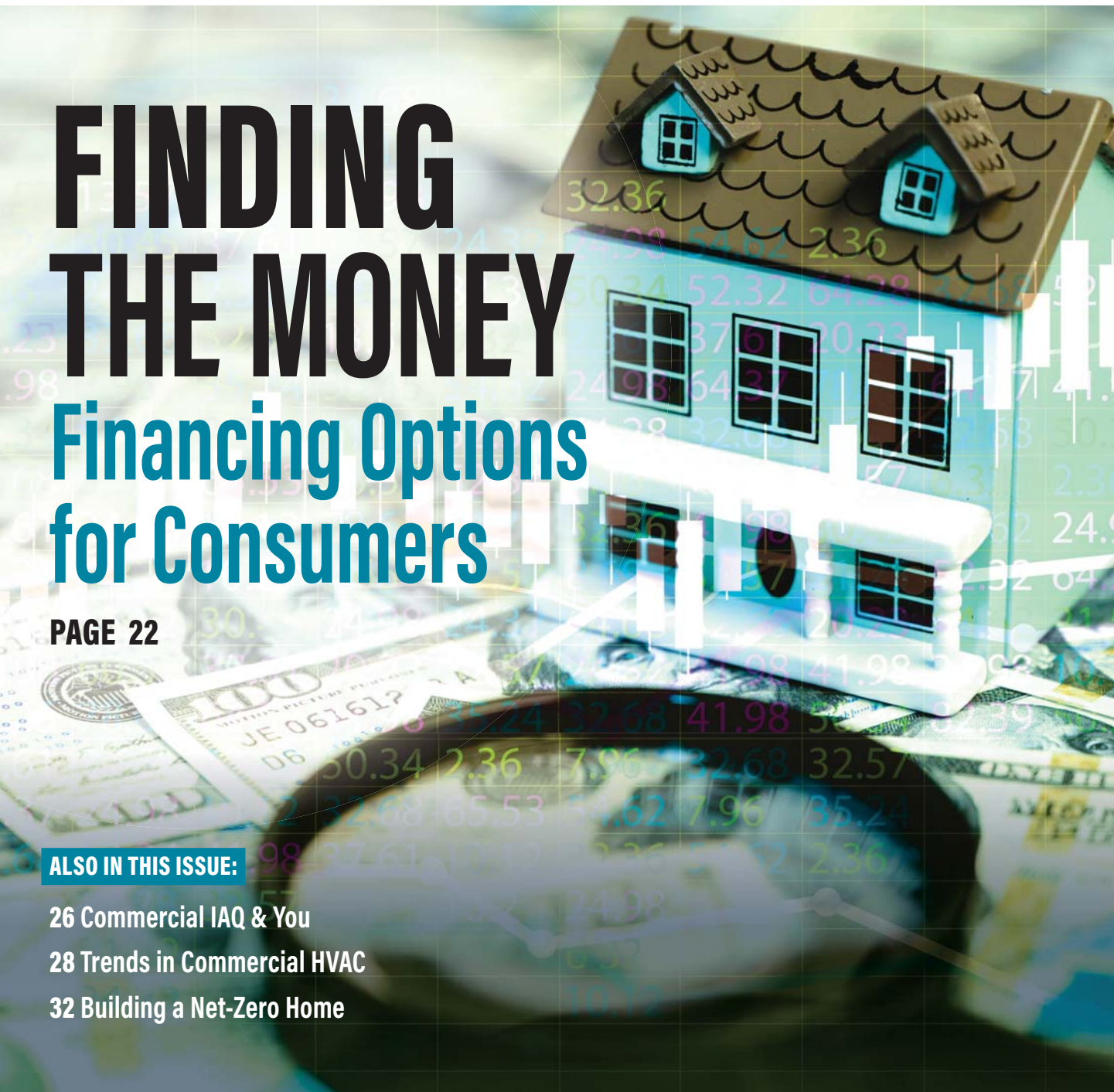
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ON THE COVER: HVAC sales pros must know the pros and cons of all consumer financing options..

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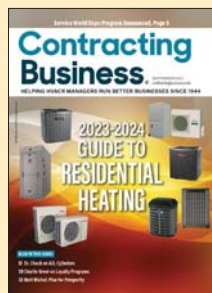
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HVAC INTELLIGENCE

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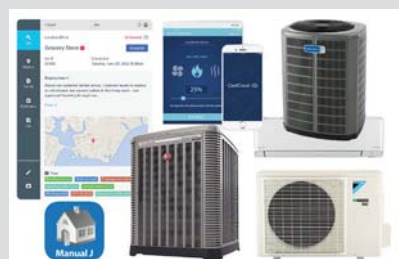
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Hall of Famer Miles & Team Keep On Hitting Home Runs

A September visit to Jerry Kelly Heating & Air Conditioning, St. Peters, Mo. provided an opportunity to check in on a good friend of this publication, Steve Miles, who leads the most excellent team at this our 2006 Residential Contractor of the Year.

The occasion for my visit was to present CEO Miles with admission to the *Contracting Business* HVAC Hall of Fame, reserved for independent business owners who have devoted a lifetime to excellence in HVAC contracting.

Steve had requested I visit, so that he could recognize the entire Jerry Kelly team. What he didn't know was the morning his leadership team had prepared. When he entered the meeting room on this beautiful Thursday morning, he was quite surprised by the effort devoted to decorations. The audience included about half of the technician team, those not taking morning training at the local Johnstone Supply, and Steve's trusted managers, including Service Manager Shelly Smith, and Marketing Director Bethany Delaurencio. Another mutual friend, long-time *CB* author, consultant and Hall of Famer, Matt Michel, was also there as a special surprise guest.

"I don't know who screwed up [by selecting me]," Miles said. "I'm being inducted with Dominick Guarino and the late Rob Falke of National Comfort Institute, two amazing giants in the industry, but I'll take it." He also attended the presentation at Service World Expo, Oct. 3-6.

Miles joked about always keeping his opinions to himself. Truth is, Steve's passion about business excellence makes him very vocal about what needs to be in place at a successful HVAC business.

"When somebody at another company asks me, I'll tell them what I see, what I think. I don't tell them what to do, I tell them what I might change in the approach. If they're doing something good, I congratulate them, and will try to emulate it here."

One of Steve's mottos is, "Let's just suck a little less." Obviously, we want to get better. That's what we do as a company, and all you guys are part of it," he said to those present. "I couldn't have done any of this without all of you and the predecessors that have sat in your seats for the last 30 years. We thank all of them. They all had a part in getting us to where we're at. And I've got to thank my family:

my wife Jill, and Jerry and Janet Kelly, who brought me in as an electrician 30 years ago."

Always an information sponge, Steve wasted no time in attending industry events after he came on board. At those events he met many industry influencers like Matt Michel. "I joined the Excellence Alliance in the mid-'90s. And then, when Matt [rebuilt it] as Service Nation Alliance, it became a very successful organization that helps contractors around the country. We go to these meetings to learn what the best-of-the-best are doing, and we try to emulate them. That's all we've ever done," Miles said.



Steve Miles: "I'm constantly learning. And I'll tell you what, if you want to learn something, teach it."
Terry McIver

The HOF presentation was made at the company's rather new headquarters, a 21,000 sq. ft. complex that features an open-floor design, so everybody can see everybody else. There's no more hunting for each other in a maze of hallways and multiple floors. The facility gave them the ability to eliminate four buildings across 13 blocks in St. Charles, and includes a huge billboard visible from a major highway, ample space for training, screens that track and display daily company goals, and a kitchen space

I know my wife would like to have.

"Communication is better, and we've improved the advertising potential of this building versus our old location. We get 40,000 vehicles a day on this highway," he said.

The company, founded by Steve's father-in-law Jerry Kelly, has endured through every economic storm, supply chain setback or flood that came along, because it's always been grounded in solid principles of service. They're in your face, with purple truck wraps, private label products — "Emerald"—and community service. That coming Saturday was to be the company's annual Walk to End Alzheimer's Disease day, in honor of Janet Kelly, one dear lady who is afflicted by it. They foot the bill for everything, and have raised more than \$100,000 for research.

They're not the cheapest service and installation provider, and don't want to be. They pay more than local union shops, and have implemented a 4-day on/4-day off technician schedule that the team has accepted with joy. Any techs that leave often want to come back.

Congratulations, Steve Miles, and continued best wishes for you and the team at Jerry Kelly Heating & Air Conditioning! **CB**

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ANSI Approves ANSI/ACCA Manual S

ALEXANDRIA, Va.—The American National Standards Institute (ANSI) recently issued approval of proposed revisions to ANSI/ACCA Manual S® - 2014, Residential Equipment Selection. The approved standard will be designated as the 2023 edition. The standard is maintained by the Air Conditioning Contractors of America (ACCA) under the auspices of the ANSI-accredited ACCA Standards Task Team (STT). According to ACCA, America is moving toward increased use of heat pumps to support the migration toward electrification.

Additionally, there is reported to be an ever-increasing use of variable-capacity equipment. To address these changes, ACCA has updated accordingly. Along with setting clear requirements, the revised standard expanded its guidance for variable-capacity equipment.

“This new edition of Manual S is the culmination of several years of devel-

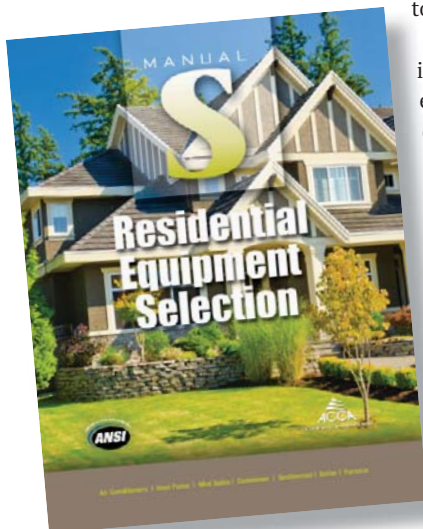
opment with cooperation from contractors, users, OEMs, utilities, and other experts focused on equipment selection and sizing,” said Anthony Maynor, RightTek HVAC Training’s president and review committee chair. “We’re very grateful for the collective effort provided by the experts who contributed; the revised standard is something for which everyone can be proud.”

The Manual S standard provides procedures for selecting and sizing residential heating, cooling, dehumidification, and humidification equipment. The Normative Sections of the standard provide the equipment selection and equipment sizing criteria necessary to implement the standard’s requirements. It is anticipated that the Normative Sections will be made available

online for free. A User’s Manual will also be available at a later date, containing informative guidance and examples based on the Normative Sections.

“We are pleased that the 2023 edition of Manual S was ANSI approved in time to be referenced by the International Code Council’s (ICC) 2024 edition of the International Residential Code (IRC),” said Barton James ACCA president and CEO. “The National Institute of Standards and Technology (NIST) research shows the impact of over-sizing HVAC equipment and under-sizing the ductwork; it creates a huge energy penalty. The Environmental Protection Agency estimates that half the homes in county have poorly installed HVAC systems, some losing as much as 40% of their energy efficiency. I think we can all agree we need to be able to ‘prove it’ to our customers. To show that we can deliver predictable results because we’ve followed proven industry standards like ACCA’s Manual S.”

For more information about Manual S or ACCA, please contact Melissa Broadus, ACCA director of member communications & committee liaison, at melissa.broadus@acca.org or (703) 824-8842.



Strikepoint Acquires Gervais

NEWARK, De.—Horizon Group Holdings, also known as Strikepoint Group Holdings, one of the largest and most referred home services companies in the United States, announced in August that it has acquired Gervais Mechanical, a leading residential and commercial HVAC, plumbing, and electrical contractor servicing Massachusetts.

Founded in 2004, Gervais Mechanical has faithfully served Massachusetts as the home services company of choice. The company is led by brothers Jeff and Scott Gervais who will continue to be responsible for the management and growth of the business going forward.

“We are honored that Gervais Mechanical has chosen to join our family of brands,” says Dave Geiger, Chairman of Horizon Group Holdings. “Gervais has achieved remarkable growth under Jeff and Scott’s leadership, and we are excited to help support



CALL FOR PROJECTS: HVAC Design/Build

Contracting Business

wants to hear about commercial contractors’ latest HVAC Design/Build projects, to be featured through the remainder of 2023 and throughout 2024.

We are seeking news FROM CONTRACTORS about recent mechanical HVAC projects that involved new Design/Build construction or retrofit activity

related to new rooftop unit installations, building controls, ductless HVAC systems, geothermal HVAC, thermal cooling, chiller installations and indoor air quality improvements. Of greatest interest are improvements to: HVAC comfort, indoor air quality, energy efficiency, environmental impact, controls integration, challenges that were overcome, and unique problems that were solved.

We will require photos of major equipment that was used, not just an exterior photo of the facility. Before-and-after photos are welcome.

Give us a shout with some of the project basics, and we’ll call to get the story.

Contact editor-in-chief Terry McIver, at 216-346-8978; tmciver@endeavorb2b.com.

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them in this new phase of growth.”

“We chose Horizon because of our shared values in people and culture coupled with Horizon’s strong history in scaling family-owned businesses,” says Jeff Gervais, President of Gervais Mechanical. “We are excited to share best practices and continuing the expansion of Gervais Mechanical.”

Terms of the transaction were not disclosed.

New Welding Procedure to Receive UA Certification

GRAND RAPIDS, Mich.—Fabrication Shop Foreman Shane Shook, employed by mechanical contractor/fabricator Andy J. Egan Co., has developed a time-saving weld procedure in partnership with the United Association of Union Plumbers and Pipefitters (UA). A certification for the procedure will soon be available to all UA members and contractors.

For many years, Egan has certified its own welders on a GTAW procedure the company internally refers to as “Hot Gas” for hand welding. This blend of 95% argon and 5% hydrogen is ideal for



Shane Shook, left, developed the welding procedure.
Andy J. Egan Co.

Egan’s work on schedule 10 piping for the process piping code. Shook explains that it creates a hotter arc which helps to penetrate thicker-walled stainless piping. Travel speed can be increased, creating less heat input, which is an important feature when welding any stainless steel.

While the Hot Gas procedure originally started with hand welding, Egan now uses it in orbital procedures for many customers, allowing welders to complete their welds at a faster rate when compared to traditional GTAW procedures. The result is a significant time savings for a repeatable, high-quality weld. “The root welds look perfect,” adds Shook.

Before purchasing new orbital welding equipment earlier this summer, Shook visited UA Local 174 Plumbers and Pipefitters for a training day. His former colleague Robert Derby, now a UA Training Specialist, was in attendance to support the training and suggested a collaboration between the UA and Egan. Derby wanted to ensure all UA members had the opportunity to get certified in the Hot Gas orbital procedure.

From there, Derby and Shook coordinated the required steps to make the certification available to the UA’s more than 368,000 members. Derby visited Egan’s Fabrication Shop in August to witness and document the procedure and expects that certification tests will be available to local training halls later this year. “It’s exciting to make this available to our members,” says Derby. “Our goal is to ensure welders of all skill levels are successful with this mix of gas.”

Jerry Kelly Co. Wins St. Louis Headliner Award

ST. PETERS, Mo.—Jerry Kelly Company, whose CEO Steve Miles was recently inducted into the **Contracting Business** HVAC Hall of Fame, has another award to add to the shelf: a 2023 STL Headliner Award for “Best Heating & Air Conditioning Company” as voted on by readers of the St. Louis Post-Dispatch.

The award was presented in the “Services” category. Voting started on May 29. Post-Dispatch staff asked the community to nominate their favorite businesses and organizations in over 110 categories. After the nomination phase, the top five businesses to receive the most nominations (including ties) in each category advanced to the voting phase. The community voted on the finalists in each category from July 5 to July 30.

Winning companies were recognized at a presentation event held at the St. Louis Ritz-Carlton hotel. The event was presented by The Hartford, and supported by Blacksmith Distillery, Blush Boutique, Kenrick’s Meats & Catering, Lou Fusz Automotive Network, OnderLaw, LLC, Röbller Vineyards, STL Design & Build, Switchgrass Spirits, Teal Cannabis, TurfGator and Yuppy Puppy Pet Spa. **CB**

Shelly Smith, general manager, Jerry Kelly Co. “The STL Headliner Award is about our marketing and the things that we do to elevate our company and earn the trust of our customers. When you walk in the door you’re alert, clean, respectful, and knowledgeable.”
Terry McIver



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Fieldpiece Named a Best Place to Work in SoCal

ORANGE, Calif. —Fieldpiece Instruments, a leading manufacturer of HVACR tools announced in August that it was one of 83 companies included in the “2023 Best Places to Work in SoCal.”



The Fieldpiece Instruments team was recognized for creating a valuable and rewarding work environment.

The privately-held company was honored as one of 83 companies named in the 2023 “Best Places to Work SoCal” list. Best Companies Group (BCG) selected the “Best Places to Work SoCal” winners based on responses from detailed,

anonymous employee surveys and ranked the winners across small, medium and large company categories. Companies located in Southern California that rated highest on issues that matter most to employees were highlighted as best places to work. The ranking is based on an analysis of survey responses about corporate culture, training and development, salary, benefits and overall employee satisfaction.

Jaime Raul Zepeda, executive vice president, Best Companies Group, said, “Southern California is home to some of the world’s top brands, leading SMBs and innovative startups. The companies that made this year’s Best Places to Work SoCal list are standouts from the thousands of employee survey responses we analyzed and reviewed. These companies are a bright spot for their employees, and we congratulate them for

creating a valuable and rewarding work environment.” Find the entire list of companies at fieldpiece.com

REHAU Names Texas Rep

LEESBURG, Va.—Leading polymer manufacturer REHAU and Reece-Hopper Sales LLC announced a partnership that will support the mechanical and plumbing market in Texas. Beginning on September 1, Reece-Hopper will expand their product line by representing REHAU polymer-based solutions for mechanical and plumbing systems. The partnership between REHAU and Reece-Hopper integrates decades of industry expertise, strengthening each company’s services to benefit contractors, engineers and wholesalers.

Reece-Hopper is a top-tier plumbing, HVAC and hardware sales agency that was founded in 2018 with the strategic merger of Ron Henson Company and RRR Industrial Sales. REHAU will



REHAU RAUPEX O2 barrier.

Event Happenings

ServiceTitan reported from its Pantheon

2023 conference the release of a suite of new products powered by artificial intelligence, to empower residential and commercial contractors with groundbreaking technology. ServiceTitan’s proprietary AI solution has been designed specifically for trade businesses, and offer cutting-edge solutions to allow its customers to automate, predict, and optimize across their entire businesses.

- **Ads Optimizer** maximizes the ROI of every dollar spent on an advertising campaign by educating Google Ads to focus on potential customers who are actively looking for service providers while avoiding users who aren’t. The feature also predicts which zip

codes will have the most demand and automatically prioritizes ads for those specific locations.

- **Dispatch Pro** runs thousands of scenarios to get the right technician to the right job, allowing dispatchers to invest more time delivering a superior customer experience. Dispatch Pro’s algorithm also finds the best technician for every job based on the technician’s specific set of skills, recent sales performance, proximity to the job, and more—all to maximize profit.
- **Integrated Financing** gives contractors the tools they need to grow their business and protect their margins. The feature allows ServiceTitan’s customers to

strategically control plans from multiple preferred financing providers on a single job, improving their customers’ approval rates. It also gives technicians confidence in offering plans that will ultimately win more high-value jobs easily.

- **Second Chance Leads** automatically detects unbooked phone calls from potential customers within minutes of the call ending, and specifically flags missed calls that the algorithm believes can be saved. The tool works in the background to identify missed opportunities so ServiceTitan customers don’t have to.

servicetitan.com/features/titan-intelligence



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Acquisition by A.O. Smith: Water Tec

MILWAUKEE, Wis.—Water technology company A.O. Smith Corp. announced on September 6 it had acquired Water Tec of Tucson, an Arizona-based water treatment company, in an all-cash transaction. Terms of the transaction were not disclosed. Water Tec joins other A. O. Smith acquisitions, Atlantic Filter (2022), Master Water Corporation (2021), Water-Right Group (2019), Hague Quality Water (2017), and Aquasana (2016) in the company's growing North America Water Treatment business. Water Tec is a manufacturer and dealer of

water treatment equipment for residential, commercial, institutional and industrial use. Water Tec's products are sold through their retail dealership located in Tucson, Arizona. aosmith.com

Carrier Named to Forbes List

INDIANAPOLIS, Ind.—Carrier announced on Aug. 24 it had been named one of the Forbes HOME Best HVAC Companies of 2023 and Best Air Conditioning Brands of 2023. Carrier's Bryant brand also appeared on the best HVAC Companies of 2023 list.

Reviewers at Forbes HOME found Carrier to have high reliability and customer satisfaction ratings, readily available replacement and repair parts, and high-efficiency models available in all sizes to meet customer needs.

Additionally, Carrier's commitment to energy efficiency and high SEER ratings consistently matches or surpasses those of competitors, voters said.

Malco Announces '23 Trade Pros of the Year

ANNANDALE, Minn.—Malco Products announced the winners of its annual HVAC "Trade-Pro of the Year" award program. The award recognizes and honors exceptional HVAC professionals who are dedicated to the industry, on-the-job safety and their communities. The 2023 program recognized five top HVAC contractors and technicians from across the U.S.:

- Jared Alexander, lead HVAC installer, DeZiel Heating & Air, Buffalo, Minn.
- Jennifer Manzo, owner, Valeriani Air Conditioning, Naples, Me.
- Ricky Meyers, owner/operator of Meyers Heating and Air, LLC, Fredericksburg, Va.
- Lee Fores, instructor and HVAC owner, Southwest Texas Junior College & Air-Tek Heating & Cooling, Uvalde, Tex.
- Bob Kler, instructor, Brownson Technical School, Anaheim, Calif.

"Malco is proud and inspired by the 2023 HVAC Trade-Pro of the Year winners for their commitment to their trade and communities," said Malco president and CEO Rich Benninghoff. "These HVAC professionals go above and beyond to share their talents with the industry and support important causes." Winners get a \$1000 Malco tool kit from their local distributor. Nominations for Malco's 2024 HVAC Trade-Pro of the Year program will open in January 2024.

Malco donates in-kind products and apparel annually to a variety of skilled trade education programs, competitions and events across the country, including high school, post-secondary technical and apprenticeship programs, regional apprenticeship contests and SkillsUSA state and national conferences. Malco coordinates the "Head of the Class" Student Recognition Program recognizes high-achieving students and entire graduating classes in HVAC/sheet metal, and building construction industries. **CB**

Appointments



Rackle

Bill Rackle is Ritchie Engineering's new western region sales manager. Rackle was first with Newell-Rubbermaid as an HVAC regional sales manager for Hilmor, Lenox and Irwin. Most recently, he was national account and western region sales manager for Milwaukee Tool. He is responsible for driving sales in the western region, as well as contributing to the marketing and business development for the YELLOW JACKET® HVACR division. "We are thrilled to welcome Bill to our team," said Gary Lampasona, vice president, sales and marketing. "He has a wealth of knowledge and experience that will serve our customers and brand very well."



Karim

Riz Karim has been appointed as chief customer officer for ECI Software Solutions, to elevate global customer experience and help drive profitable growth of small- and medium-sized office technology businesses.

Karim has more than 20 years of experience in the global software industry. He will lead customer-facing teams, collaborating across divisions—including manufacturing, residential construction, field service management, building supply, office technology and wholesale/retail distribution industries—to deliver exceptional customer support and professional services.

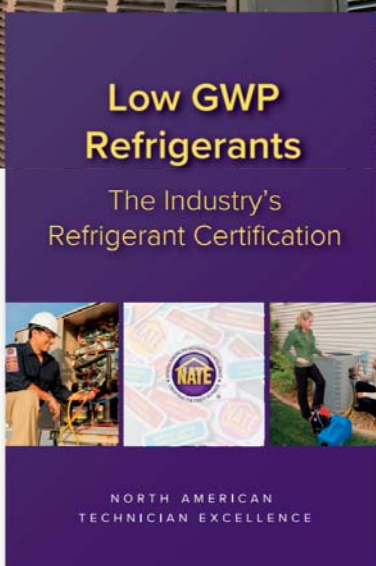
Previously, Karim served as senior vice president of global services and support at Everbridge, a global leader in critical event management and national public warning software solutions, where he launched and managed the company's customer success function. Karim also served on Everbridge's senior leadership team as the company went through a successful IPO and growth phase, consistently achieving strong net promoter scores and gross revenue retention rates and establishing an award-winning customer support organization.

"The chief customer officer position is incredibly important, as we're wholly focused on helping small- and medium-sized businesses compete and grow. Riz not only brings a deep understanding of customer needs, but also has a proven track record of leading global support teams," said Trevor Gruenewald, CEO of ECI Software Solutions.



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INSTRUMENTS

The new R-32 and R-454A A2L refrigerants are categorized as slightly flammable, so left-handed connections on the tanks were implemented to differentiate them from A1, non-flammable refrigerants. In preparation for the industry adopting these new refrigerants, the new YELLOW JACKET® A2L Tank Adapters and Charging Hoses incorporate left-handed connections so a



service technician can safely charge A2L refrigerant systems. The double ring on the tightening knurl on these adapters and hoses make the left-handed connection easy to identify. The moisture barrier on the PLUS II™ hoses provides improved resistance to moisture migration which contaminates expensive refrigerants.

For more information, visit <https://yellowjacket.com/product/a2l-adapters-and-hoses/>

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AIR HANDLERS

With up to 98 percent AFUE heating performance, the Goodman® brand GMVM97 gas furnace provides exceptional energy efficiencies in a feature-rich package integrated with award-winning ComfortBridge™ communicating technology to make contractors' lives simpler.



Accessing ComfortBridge™ via the CoolCloud™ phone/tablet app, HVAC contractors can connect for quick, accurate configuration, diagnostics and service. Providing efficient, precise comfort, the modulating, variable-speed ECM gas furnace employs a stout, heavy-duty aluminized-steel tubular heat exchanger—formed using wrinkle-bend technology—and a resilient, stainless-steel secondary heat exchanger.

With lower NOx emission, Goodman's GMVM97 is available from 60,000-120,000 BTU/h. Features include a self-calibrating modulating gas valve; auto-configuration; and self-diagnostic control board with constant-memory fault-code history output. Convenient multi-position installation; easy-to-install top/side venting; left/right connection for gas/electrical service; and an airtight solid bottom or side return with easy-cut tables for effortless removal in bottom air-inlet applications.

Backed by a Lifetime Heat Exchanger Limited Warranty and more. Rebates available through 2023. goodmanmfg.com

Earning Most Efficient of ENERGY STAR® 2023, the Daikin DM97MC variable-speed, modulating gas furnace typically runs at the lowest possible speed, precisely maintaining steady temperatures and delivering optimal heating performance with quiet air circulation.



Built for resilience, the DM97MC features a uniquely designed, heavy-duty, tubular stainless-steel primary heat exchanger for both outstanding durability and heat transfer. It's secondary stainless steel heat exchanger adds increased efficiency. Self-calibrating modulation gas valve auto-configures for each installation.

With up to 98 percent AFUE performance, DM97MCs feature a convenient multi-position installation design; easy-to-install top venting with optional side venting; left/right connection for gas/electrical service; airtight solid bottom or side return with easy-cut tabs for effortless removal in bottom air-inlet applications; self-diagnostic control board with constant memory fault code history; durable Silicon Nitride igniter; plus, available auto-comfort and enhanced dehumidification modes.

Compatible with Daikin ONE+ smart thermostat and other Daikin communicating equipment for easier commissioning/servicing. NorthAmerica-Daikin.com

The **Rheem® Endeavor™ Line Classic®** Series R951V Ultra Low NOx Gas Furnace offers a reliable way to keep homeowners comfortable. It is designed for lasting energy-efficient comfort that saves users money while delivering peace of mind. This 95% AFUE, ENERGY STAR® certified gas furnace is close to perfect when it comes to efficiently converting gas to heat. The Ultra Low NOx operation lowers the homeowner's carbon footprint by minimizing greenhouse gases while offering energy costs savings, up to \$85 annually, and potentially even more with available rebates.



The furnace's variable speed motor technology ensures a steady stream of just-right heated airflow to maintain comfort levels while providing superior humidity control. The insulated cabinet and truly variable speed airflow technology—guarantee quiet operation.

Features such as the PlusOne® Ignition System allow for reliability and longevity while the PlusOne Water Management System is a Rheem-exclusive patented sensor that shuts off the furnace if a blocked drain is detected.

Contractors can be assured of easy, hassle-free installation and serviceability, thanks to the Built-in Bluetooth® connectivity. Also, the user friendly EcoNet® Smart Thermostat helps homeowners lower their energy costs and keep their home comfortable.

With one of the best warranties in the market, Rheem offers 10 Year Conditional Parts (with registration) + Limited Lifetime Heat Exchanger. rheem.com/endeavor/

Aspen Manufacturing's LGM Series high-efficiency, multi-position, aluminum coil 120-volt air handlers. offers outstanding installation versatility. The units are shipped as upflow or horizontal right and can be converted for downflow or horizontal left installations onsite by HVAC technicians. When a proper metering device is used, the LGM Series units are ETL listed for use with R-22 or R-410A refrigerants. In addition, they can be AHRI certified with most brands of air conditioners or heat pumps. Available in 2- through 4-ton cooling capacity without electric heat, all LGM Series models are backed by a 10-Year Limited Warranty.

When properly installed and tested in accordance with ASHRAE standard 193, the sturdy, fully insulated galvanized steel cabinet offers less than 2% air leakage from the cabinet. A factory-provided knockout for duct return is standard on all LGM Series models, and all feature an easy access door for coil cleaning. aspenmfg.com



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FANS

Greenheck has added fan filter diffusers to its growing line of healthcare, laboratory, and cleanroom (HLC) air distribution products. Fan filter diffusers are unidirectional diffusers with integrated EC motors and high-efficiency filters that provide ultra-clean air necessary in critical applications or retrofit applications where additional power is needed to overcome filter

METUS Collaborates with SPAN to Speed Electrification

SUWANEE, Ga., September 07, 2023—Mitsubishi Electric

Trane HVAC US LLC announced it will introduce a new integration for its all-climate heat pumps with SPAN.IO, Inc. maker of what sources report is the leading smart electrical panel. The collaboration between these award-winning category leaders is anticipated to accelerate household electrification and energy efficiency.

The METUS-SPAN product integration, once available, is anticipated to help homeowners eliminate dependence on fossil-fuel-reliant heating and cooling systems and conventional electrical panels. In a METUS-conducted survey in 2023 of approximately 1000 U.S. homeowners, almost 83% of respondents stated that they are either "somewhat concerned", "very concerned" or "extremely concerned" about the impact of energy bills on their household budget. Mitsubishi Electric's all-electric heating and cooling systems are designed to reduce energy use compared to conventional HVAC systems.

According to an analysis conducted by Pecan Street in 2021, approximately 48 million single family homes may need an electric service panel upgrade before they can fully electrify¹ which can include homeowners installing an all-electric heating and cooling system. Smart electrical panels offer an immediate solution to scale the electrical grid by optimizing existing infrastructure, supporting electrification, and contributing to greater sustainability.

"Installation of energy efficient all-climate heat pumps is accelerating the path to broader decarbonization," said Mark Kuntz, chief executive officer, Mitsubishi Electric Trane HVAC US. "Converting from fossil fuels to heat pumps requires more electrical capacity than many older homes' existing circuit breaker panels and electric service are capable of. We believe the SPAN Panel provides a way for homeowners across America to add our all-climate heat pumps using their existing electrical service."

The METUS-SPAN integration, activated through the kumo cloud® app, is expected to help HVAC contractors reduce installation time by reducing the need for additional coordination with utilities to replace the electrical service to a home. By using the SPAN panel, homeowners may avoid the cost and inconvenience of an electrical service upgrade from their utility. SPAN Panels are designed to allow homeowners to make upgrades while using their home's existing electrical service.

Because a Mitsubishi Electric heat pump operates at partial-load using inverter-compressor technology, the SPAN Panel will be able to send a command to Mitsubishi Electric's heat pump through the kumo cloud® app to reduce the capacity to divert the power load to other appliances. METUS and SPAN products are available through distributors, and METUS and SPAN anticipate launching the integration via an over-the-air software update in late 2023.

¹ <https://www.pecanstreet.org/2021/08/panel-size/>



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pressure drop. Ceiling-mounted, inline, and portable models are available.

Model HLC-FPS is a self-contained fan filter supply diffuser with industry-leading airflow rates up to 1200 cfm to meet USP 797 and 800 air change requirements. The HLC-FPS connects directly to system ductwork and is simple to install in a ceiling grid or hard ceiling.

Model HLC-FPR is a ceiling or wall-mounted fan filter return diffuser that creates a negative pressure environment drawing air up and out of a room, removing airborne contaminants via the unit's gel-seal high-efficiency filter, and discharging clean air.

Model HLC-FPI is a ducted inline fan filter unit designed to continuously filter the air passing through the unit and remove a wide range of airborne contaminants, making it ideal for schools, office buildings, and other commercial indoor environments.

Model HLC-FPC is a fan filter mobile cart available in both recirculation and return/exhaust configurations that can act as an in-room air purification device.

The company reports Greenheck fan filter diffusers provide quiet, energy-efficient operation and can be specified with HEPA or ULPA filters, or supplementary MERV-rated pre-filters depending on the application. Greenheck's HLC product line also includes laminar flow diffusers, radial flow diffusers, and surgical air curtains that are designed, engineered, and tested to meet or exceed critical environment standards for airflow performance and filtration efficiency. greenheck.com

The NS is **Revcor's** next-generation swept fan blade, incorporating state-of-the-art design features to provide improvement in efficiency. The NS design sets a new standard, sources report, in achieving high performance without high cost. Its highly engineered design and thorough testing have resulted in a high-performance fan blade without a premium price. revcor.com

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Leak Defense has announced the release of BuildAlert, a new system that allows users to gain 24/7 visibility into their construction jobsite. It enables the ability to automatically turn off water in the event of a leak—both during and after working hours.

BuildAlert offers a comprehensive set of features designed to streamline and enhance water management at construction sites. With automatic controls, displays, and alarms, users have easy access to essential functions whether on or off

the jobsite. The system utilizes remote ON/OFF capabilities accessible via a free PC or Mobile App, making it convenient to control operations as long as there's a jobsite internet connection.

For added convenience and security, BuildAlert allows users to schedule automatic scene/mode changes after hours. Furthermore, the system maintains jobsite water pressure to help ensure a steady supply of water. For advanced integration and customization, the system offers an optional API for input/output signaling to remote systems, output alarms, or building management systems/building automation systems (BMS/BAS). LeakDefense.com/Commercial



Uponor's crosslinked polyethylene (PEX) tubing is a flexible, durable, cost-effective piping solution for plumbing, fire safety, radiant heating/cooling, hydronic distribution piping and pre-insulated piping systems. Available in sizes up to 4-in., Uponor PEX is approved for direct burial in the soil or slab, is plenum rated for commercial piping applications and is the most third-party tested, listed and code approved PEX in the industry.

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The **WaterFurnace 7 Series** provides homeowners the ultimate in comfort and performance. The 700A11 boasts innovations on multiple fronts—most notably as the geothermal industry's first fully launched variable capacity residential unit and the only unit to surpass both the 41-EER and 5.3-COP efficiency barriers. The unit's variable capacity technology features a variable capacity compressor, variable speed loop pump, and variable speed blower motor to offer a level of comfort that has to be experienced. Communicating Aurora controls provide simple diagnosis and troubleshooting while also offering informative energy monitoring. waterfurnace.com

Watts released Freeze Sensing Technology on 1-2 in. Series 800 Pressure Vacuum Breakers [PVB].

Preinstalled, connection-capable freeze sensors will now come standard on 1", 1 ¼", 1 ½", and 2" Watts Series 800 pressure vacuum breaker backflow preventers. This new technology can be combined with Building Management Systems (BMS) and Irrigation Management Systems (IMS) to receive freeze alerts with a separately purchased add-on activation kit.

Receive freeze alerts via sensor and take action to prevent freeze damage. Monitor your backflow preventer 24/7. Reduce water waste as a result of freeze damage. watts.com/Freeze-Detection

All product claims are made by the manufacturers.



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—LUPE MEZA

The scorching heat of the Arizona summer is unforgiving, with temperatures often crossing the 110-degree mark. Between June and August, Phoenix recorded 50 days with temperatures of 110.¹ While many wilt under its intensity, during this period, a professional like Lupe Meza, the lead technician at Tempe, AZ-based AC&Refrigeration, truly keeps his cool.

His exceptional attitude is matched only by his profound technical proficiency. Lupe's vast experience of more than 15 years on the job allows him to diagnose problems quickly and efficiently, whether it concerns sensors or refrigerant levels. These diagnoses could have easily been protracted, but with his expertise, he could reduce work hours on complex repairs.

"It wasn't just his technical prowess that set him apart but also his role as a mentor," said Kevin Price, AC & Refrigeration's chief marketing officer. "Lupe became the guiding light for the company's younger technicians. He generously shared his hard-earned knowledge, tricks, and tips from his time in the field. He went above and beyond and volunteered for extra weekend callouts, offering a much-needed respite to his colleagues."

For example, when on a call in the Phoenix suburb, he phones each customer if he's running late because a previous visit took longer than expected. "No one wants a technician to be late, but it's even more frustrating if they don't keep the customer in the loop," Lupe said. "I even call just before I get to the house, telling the homeowner that I'll arrive shortly."

He acknowledged that some customers can be frantic when they lack air-conditioning. "If I feel the customer is getting upset, I take a few breaths, explain in detail what I will do to get the system operating, and I'll give them an estimate of how long

it will take," Lupe said. "Of course, it's important to be as close to the time as possible."

As a husband and father of two children, Lupe says he knows that family time is important to every technician, so that he would volunteer for those weekend callouts. "I always think that leadership by example is the best way to demonstrate how you should act," Lupe said. "I have more than 15 years in the HVACR industry, and it's important not only to share your knowledge but to put your work ethic into practice. One of those is to assume the burden of sharing those weekend callouts."

"I always think that leadership by example is the best way to demonstrate how you should act." —LUPE MEZA

Despite clocking in 13-hour days this summer, Lupe maintained his composure, keeping cool under the intense pressure of both the job and the weather. Lupe never lost his poise, an attribute his customers appreciated. His commitment to top-notch customer service was evident, with homeowners taking to Google Reviews to praise his commendable blend of professionalism and friendliness.

"Lupe's stellar technical skills and nurturing attitude were invaluable throughout the summer," said Price. "His contributions were instrumental in keeping our operations fluid. Lupe is more than just an HVACR technician; he is our HVACR rock star. His impact on our business and morale this summer is nothing short of extraordinary. Lupe has unquestionably earned the title of 'HVACR Summer Superstar'." **CB**

1. <https://bit.ly/48ju5lk>

Tom Perić is a freelance writer with vast experience in public relations, reporting and writing about the HVACR industry.



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HVAC Salespeople Must Know About Financing

Your sales team should know the pros and cons of various types of consumer credit.

The consumer cost for a new comfort system has doubled over the past few years. Inflation, supply chain issues, and especially, government regulations have all combined to hammer the consumer. Except for the extremely affluent, almost all consumers will need some form of financing to be able to replace their comfort systems. HVAC salespeople need to become conversant with financing to close sales today.

Revolving Credit

In the past, all manufacturer financing was revolving. This is identical to buying with a credit card. Each month, the consumer must make a minimum payment, typically 2% of the outstanding balance. If the borrower only pays the minimum payment, it will be a very, very long time to pay off the loan.

Installment Financing

Installment financing is replacing revolving as the preferred method for HVAC. It is identical to the typical fixed rate mortgage. There are a fixed number of payments (i.e., the term) at a given interest rate. At the end of the payments, the note is paid.

For relatively short term loans (i.e., five years or less), revolving credit with a 2% payment will result in lower payments. Beyond 60 months, installment financing results in lower payments than revolving credit. Extended term financing better aligns the payments of the comfort system with the life of the system.

A \$15,000 comfort system under a revolving plan with a 2% minimum payment and 9% annual interest requires an initial payment of \$300. This is roughly the same for an installment plan with a 60-month term. Frankly, if the consumer makes the \$300



payment each month on the revolving plan, he will pay off the note in 60 months. Things change when the term extends beyond 60 months. At 96 months, an installment note will lower the payment to \$220. At 120 months (i.e., 10 years), the payments drop to \$190.

Extended term financing allows the homeowner to lower his payment.

Alternatively, the homeowner could keep the payment the same or reduce it slightly and buy a better comfort system with IAQ accessories, connected home products, extended warranties, higher efficiency equipment, or any other enhancements the homeowner desires.

Second Look Financing

Many consumers are credit challenged. When they fail to receive approval, special lenders will give the credit application a “second look.” When approved, there are usually accompanying conditions, such as a lower credit limit. The contractor may change the comfort system offering to reduce its price and/or reduce margins to help the consumer acquire a comfort system. Many of today’s HVAC lenders have tie-ins with second look lenders so that the application automatically cascades down to the second look lender if the initial credit application is denied.

Be familiar with second look lenders and the process.

Home Equity Loans

If a homeowner has equity in his home (i.e., it is worth more than the mortgage), he can borrow against the equity in the home. Some HVAC contractors have worked with local lenders to streamline the application process. Enterprising salespeople have even used home equity loans to not only pay for the comfort system, but to consolidate the homeowner’s credit card and consumer debt, often resulting in lower overall credit payments.



Utility Loans

In some areas, utilities have special financing available for energy efficiency improvements. The utility programs vary widely. Salespeople should be conversant with the programs for each utility in a market areas.

Equipment Leasing

A “new” type of lending program has emerged lately. It is equipment leasing. Consumers often incorrectly associate equipment leasing with car leasing. In a car lease, the borrower is paying for the anticipated depreciation of the vehicle for a fixed period of time, given a certain number of miles driven.

Equipment leasing is really just installment financing with a cash buyout at the end of the term. The contractor hopes the homeowner will apply the buyout to a new system and continue making payments. Of course, as with any new financing vehicles, there are variations with some offerings.

Turndowns are Not an Issue

Many contractors hesitate to offer financing out of fear that lenders will reject a borrower due to bad credit. These borrowers typically know they have bad credit, but are unable to buy a system any other way and there is a chance that second look programs or a home equity loan will succeed. It is unlikely they will be able to buy a new system otherwise.

By refusing to offer financing, you are requiring the homeowner to find it on their own. If they qualify with you, the odds are better they will buy from you. If they qualify on their own, they can buy from anyone. In addition, marketing research has consistently shown that consumers who finance their purchases through a contractor spend significantly more. **CB**

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Matt Michel is an author and member of the Contracting Business HVAC Hall of Fame. Email Matt at mmichel@mail.com.

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Maximize Commercial HVAC with Indoor Air Quality Services

Awareness of building IAQ is higher than it's ever been. For a new profit center, position your commercial HVAC business as a provider of indoor air quality solutions.

As commercial HVAC contractors, you're already well-versed in the importance of maintaining heating, ventilation, and air conditioning systems for your clients. However, if you're looking to take your business to the next level and boost your sales, consider diversifying your offerings to include Indoor Air Quality (IAQ) services. With growing awareness of the significance of clean and healthy indoor air, providing IAQ solutions can not only benefit your customers but also significantly increase your revenue. Also consider the challenges many of your building owners and property managers are struggling with, i.e., getting occupancy rates back up. In this article, we'll explore how to expand your HVAC business into IAQ services and take your sales to new heights while helping your clients make their spaces more attractive to potential tenants.

Understanding the IAQ Market

It's essential to understand the current IAQ market and its potential. According to sources like the Environmental Protection Agency (EPA) and the American Lung

Association, poor indoor air quality can lead to various health issues, including allergies, respiratory problems, and even long-term illnesses. As more people become aware of these risks, there's a growing demand for IAQ solutions in both residential and commercial settings.

Conduct Market Research

Begin your IAQ journey by conducting thorough market research. Factors to consider include:

- **Local Regulations:** Research local IAQ regulations and standards, as these can vary by region. Understanding these guidelines will ensure that your services comply with local requirements.
- **Customer Demand:** Survey your existing clients to gauge their interest in IAQ services. You can also look at industry reports to identify trends and opportunities in your area.
- **Competitor Analysis:** Study your competitors who offer IAQ services. Are their gaps in their offerings you can fill?

Training and Certification

To provide IAQ services effectively, it's crucial to invest in training and certification for your technicians. Organizations like the Indoor Air Quality Association (IAQA) and the National Air Duct Cleaners Association (NADCA) offer courses and certifications that can help your team become experts in IAQ assessments and solutions. Certification not only enhances your team's skills but also builds trust with your clients, demonstrating your commitment to quality. Become familiar with air diagnostic tools and treatment strategies. Also consider reading through the newly published ASHRAE Standard 241-2023 "Control of Infectious Aerosols".

Expanding Your Service Portfolio

Once you're equipped with the necessary knowledge and certifications, it's time to expand your service portfolio. Here are some IAQ services you can consider offering:

- **Air Quality Assessments:** Conduct comprehensive IAQ assessments to identify potential issues in a

commercial space. Use specialized equipment to measure indoor air pollutants, humidity levels, and ventilation efficiency.

- **Air Duct Cleaning:** Clean and sanitize air ducts to remove dust, mold, and other contaminants that can compromise indoor air quality.
- **HVAC System Upgrades:** Offer services like UV germicidal irradiation, which can kill airborne pathogens, or high-efficiency filtration systems to improve air quality.
- **Indoor Air Purification:** Install air purifiers and filtration systems that can effectively remove pollutants, allergens, and viruses from the air. Make sure you choose a product that is third-party tested and validated for efficacy, and is UL 2998 listed, ensuring the device does not produce ozone.

Marketing Your IAQ Services

Promoting your new IAQ services is crucial to attracting clients. Consider these strategies:

- **Website and Online Presence:** Update your website to include information about your IAQ services. Create blog posts and informative content to educate your audience about the importance of IAQ.
- **Client Education:** Educate your existing clients about IAQ through newsletters or seminars. Knowledgeable clients are more likely to request your services.
- **Networking:** Attend industry events and join local business associations.

Pricing and Packaging

Determine competitive pricing for your IAQ services by analyzing your costs, market rates, and the value you provide. Consider creating packages that bundle IAQ services with your HVAC maintenance contracts. This not only encourages clients to opt for IAQ solutions but also secures recurring revenue for your business.

Strategic Move to "Next Level"

Expanding your HVAC business into IAQ services is a strategic move that can take your sales to the next level. By conducting

thorough research, investing in training, expanding your service portfolio, and effectively marketing your IAQ services, you can position your HVAC business as a trusted provider of comprehensive indoor air quality solutions. **CB**

Sources:

<https://www.epa.gov/indoor-air-quality-iaq>; <https://www.lung.org/clean-air/at-home/indoor-air-quality>; <https://iaqa.org>; <https://nadca.com>

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Commercial HVAC Trends, 2023 and Beyond

The Center on Global Energy Policy recently reported the buildings sector worldwide consumes approximately 30% of global energy—natural gas, electricity and solid and liquid fuels for heating, cooling, lighting, equipment and cooking. The commentary also pointed out the importance of decarbonization in the buildings sector.

Interest in eco-friendly commercial buildings is on the rise, especially with increasing reports of global warming and the impact of companies using vast amounts of the planet's resources. Couple this with rising scrutiny of organizations' environmental, social and governance (ESG) initiatives, building owners' and other stakeholders' reputations and revenue depend upon taking steps to become more sustainable.

Here are five trends Mitsubishi Electric Trane HVAC US (METUS) believes will become more prevalent in 2023 and in the coming years in the United States.

Inflation Reduction Act Upgrades

The Inflation Reduction Act signed into law in August 2022, is the United States' largest climate investment initiative in the country's history. With the IRA set to funnel hundreds of millions of dollars in rebates and tax credits for greener and more energy-efficient building upgrades, commercial builders, architects, engineers and building owners will increasingly search for ways to take advantage of these lucrative incentives and the long-term energy savings accompanying them.

For example, the 179D commercial buildings energy efficiency tax deduction now offers base tax deductions to commercial building owners and designers of buildings that meet certain energy efficiency standards. Deductions work on a sliding scale of \$.50 per square foot for energy savings of 25% and up to \$1 per square foot for energy savings of 50% or greater. Bonus deductions are on a sliding scale of \$2.50 per square foot for energy savings of

25% and up to \$5 per square foot of energy savings of 50% or greater. Depending on the size of a commercial project and if it meets certain prevailing wage requirements, savings can be considerable.

By installing energy-efficient and greener equipment like all-electric heat pump HVAC systems, electric ovens, electric water heaters and more, as well as technology to monitor energy consumption closely, more commercial builders and others mentioned above will be able to claim the IRA incentives.

Installation of Energy-Efficient Equipment

As operators look closer at their buildings' power usage, they are increasingly wanting to install more environmentally friendly and energy-efficient equipment. Some of this more energy-efficient equipment includes buildings switching to use all-electric variable refrigerant flow (VRF) technology, the fastest-growing segment of the commercial HVAC industry, as well as zoning and smarter system controls.

VRF technology allows a building to be divided up into zones for heating and air conditioning, ensuring that energy is being used more efficiently only in the spaces where air is needed. For example, a hotel would be able to set back or turn off systems in unoccupied rooms, or an office building manager would be able to better control specific tenants' heating and air conditioning. Additionally, if builders and building owners choose electric versions of VRF technology, they will also make their buildings greener by reducing dependence on fossil fuels. Zoning is made possible through systems controls becoming smarter and easier for building owners and managers to navigate.

Renewable Energy Generation

Commercial buildings will use more of their free outdoor space, such as roofs, for photovoltaic systems or solar panels. They

will pair this renewable energy generation with energy storage. Generating, storing and tapping into their own renewable energy will help reduce a building's carbon footprint and utility bills—of particular importance since energy bills are becoming more expensive. For the commercial sector, the price of energy went up nearly 13% between January 2022 and January 2023.

By storing electricity through ultra-large batteries, for instance, buildings can use their reserves when needed. According to the Environmental Protection Agency (EPA), “electricity storage could help the utility grid operate more efficiently, reduce the likelihood of brownouts during peak demand and allow for more renewable resources to be built and used.”

When builders combine solar panels with advanced, energy-efficient heat pumps, the savings can be sizeable since the sun is the source often powering the heat pumps instead of electricity. It is easy to see why this carbon emissions-reducing duo paired with energy storage are increasingly being used: when the sun is not shining, buildings can tap into their own electricity reserves, reducing energy bills.

Building Materials

Section 60503 of the IRA appropriates funding to the General Services Administration (GSA) for construction materials and products with substantially reduced levels of embodied greenhouse gas emissions, also known as low-embodied carbon rates,

to be used on federal construction projects. These actions are expected to grow the market for even lower-carbon construction materials and prompt more industry innovation. As such, the buildings industry will increasingly use materials with low-embodied carbon rates.

Water Conservation & Water Heating

Builders will continue to look at rainwater capture and other water-conservation methods to decrease their burden on city and county water supplies, especially in the Western United States, where water resources are stretched thin. Successive, compounding years of drought have led to reclamation facilities realizing below-normal inflows and water storage. As a result, onsite water reuse systems are gaining traction nationwide. These systems collect and treat water from onsite sources like stormwater, wastewater and rainwater. The systems then reuse non-potable water for things like outdoor irrigation and flushing toilets.

Additionally, the industry will install more smart water monitoring systems to provide owners and property managers with data surrounding water consumption. Benefits include the system alerting these stakeholders when leaks, malfunctions or other upticks in water usage are detected so challenges can be swiftly addressed.

Other technologies being adopted to make water usage more sustainable include electric hot water heating systems, replacing gas-powered hot water heaters. **CB**

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Achieve Building Operational 'Nirvana' Through Retro-commissioning



Nirvana, by simple definition is “An ideal condition of rest, harmony, stability, or joy.”

You may be saying, “How can such a bold statement be made regarding the operation of an inanimate object?” Simple, it’s not one! A building is really very dynamic and complex in nature, constantly responding to its ever changing *internal* and *external* environments.

So why retro-commissioning? Why not “just commission it”? I guess to understand that, we first need to understand commissioning (CX), and the various types, at its very core.

New building CX strives to assure a building operates as the design team envisioned, based on the operating guidelines put forth by the owner, on its intended use and operation.

Re-commissioning basically tunes up the building, so it is operating as the “*initial*” envisioned design intended, with no changes.

Retro-Commissioning (RCX) holistically looks at the building as it actually operates day to day in the “real world”—not the theoretical assumed one on how it would. RCX is where energy management and commissioning join forces to improve a facilities operation, or where a ASHRAE Level 2 Energy Audit comes to fulfill its destiny. So how do you get started or better yet how do I get there from here?

We are going to start with the basic premise that an owner already believes his or her building needs to be retro commissioned. The diagram below outlines the five basic phases and subsequent steps to follow for this process to be successful.

1. Planning Phase (Pre-Site Visit)

- Review existing building design documents
- Benchmark building
- Develop RCX plan
- Request Building Management System (BMS) trending of equipment if applicable)
- Conduct stakeholder interviews with owner, occupants, maintenance staff and others.



Al LaPera

2. Investigation Phase (Site Visit)

- Perform ASHRAE Level 2 energy audit
- Access building envelope and its major systems
- Equipment diagnostic testing (if deemed to be required)
- Determine major systems condition, operation, remaining useful life & energy health

3. Analysis Phase (Building Optimization)

- Evaluate all findings
- Perform a calibrated energy model on building
- Review BMS trends
- Develop all energy conservation measures (ECM)
- Review with client

4. Implementation Phase (Operational Improvements)

- Prepare ECM documents
- Implement scope
- Retro-commission systems
- Verify results

5. Verification Phase

- Prepare final summary report
- Develop a systems manual
- Develop a re-commissioning plan
- If the owner desires it, develop a measurement & verification (M&V) plan
- Develop persistence of savings strategies

The 5th and final phase (Verification Phase) is where all the planning, hard work and the visioning come together. This is where all the owner approved ECM have been implemented, tested, and fully commissioned. The implemented ECM could include a plethora of varying scope tasks like replacement of some major equipment for energy efficiency reasons or adding new seals to the windows. However, more than likely, the modifications are more operational in nature, requiring BMS control language modifications to control sequences, along with system verification and tune up (ie: testing and balancing). This is where the hired team shines, putting the systems and new sequence modifications

thru their paces and don't stop until they all are operating in harmony.

Finally, how to pick the leader for this band? You might be thinking should it be a commissioning agent, or should it be an energy manager? I'm here to tell you, in my opinion for it to be successful, you really need both, (along with a good testing and balancing agency partner).

You might be asking, Why both? it's a commissioning task. It's both because this endeavor requires the knowledge base, expertise, and skillsets that each one provides. Occasionally, the purple unicorn does exist, and they are one in the same person, but often times they come

The commissioning firm you hire should have a reasonable track record for this type of work.

as a team. The commissioning agent is the "nuts and bolts" person who can make the operational harmony happen. Whereas the energy manager brings building system analytics capabilities, energy simulation modeling and analysis along with utility rate structure understanding.

It's my humble opinion, that when you are going to market, you hire the right firm for this. I suggest the following path be followed.

- Send out as a Request for Qualifications (RFQ)—DON'T PICK BASED ON MONEY
- The energy manager and the commissioning agent are from the same firm or are same person
- The firm has a reasonable track record for this type of work
- Request to assemble a complete team including:
 - Engineer to prepare plans, if needed (unless directed otherwise)
 - Test and balance agency
 - Building's Automation Controls contractor.

Following the patch as described above will lead you to a successful project that are better for the client, the employees and the environment. **CB**

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Building and Conditioning Scalable, Affordable Net Zero Homes

The “Holy Grail” of energy efficiency in home construction may be net-zero energy. To achieve this coveted title, a home must produce as much energy as it consumes in a calendar year, typically via solar or wind.

“Net-zero has been an obtainable goal for decades, but almost always at a prohibitive initial cost,” said Tom Danielsen, founder of Danielsen Construction and Energy Management, in Altaville, CA. “That’s what I’m working hard to change.”

Danielsen has been a builder since 1990, and specialized in energy efficient construction in '04. Now, after nearly two decades focused on reducing residential energy consumption, he’s developed what he calls “net-zero for pennies.”

“Typically, achieving net-zero is exorbitantly expensive,” said Danielsen. “I’ve spent the bulk of my career addressing that concern.”

That’s not to say that Danielsen hasn’t built and retrofitted homes with multi-million dollar price tags. He certainly has, and in the process he’s developed a reputation for reducing the energy consumption of structures large and small. But he’s always wanted to prove that by adopting net-zero as the goal early in the design process and keeping the project simple, the cost-per-square-foot

difference between a traditional home and a net-zero home can be mere pennies, without sacrificing comfort or convenience.

Danielsen’s territory—east of San Francisco by about 100 miles—falls in California Climate Zone 12, which experiences cooler winters and hotter summers than the Bay Area, for example. Pair that with some of the highest utility costs nationwide, and you’d be hard pressed to find a better place to push the envelope on net-zero innovation than Calaveras County, CA.

Pilot project

In 2019, Danielsen was serving on the board of the Calaveras County Habitat for Humanity, a non-profit that helps people obtain safe, comfortable and affordable housing. His company has retrofitted many existing Habitat for Humanity houses with energy efficient upgrades. But it wasn’t until more recently that Danielsen took control of a new construction project for the organization, with plans to definitively prove his “net-zero for pennies,” theory and, hopefully, use the home as a pilot project for many to come.

Danielsen presented the Board with his idea to build an experimental home. The goal was to: a) prove that his net-zero construction method is replicable at scale b) prove that the home has a similar square-foot cost as traditionally-built homes and c) have an unbiased third-party measure the energy performance of the home. The Board agreed.

“We build and retrofit homes with energy efficiency in mind all the time, but we’ve never had the opportunity to apply everything we’ve learned on a single project and gather persistent energy data,” said Danielsen. “That’s what this particular project allowed us to do.”



The 1,250 square-foot home features a 2.76 kW photovoltaic solar array. Tom Danielsen

Experience Applied

"In any discussion of how to make a home efficient, the three main topics are inevitably the quality of the insulation, the way the house is air sealed, and the star of the show - the HVAC system," said Danielsen. "Each of these components relies on the other two."

Installing insulation properly is just as important as the quality of the insulation itself, according to Danielsen. He uses Owens Corning L77 BIB (blown in blanket) insulation in the ceilings (R-40) and walls (R-21). Spray foam, he says, generates too many VOCs in the occupied space, and batt insulation doesn't perform well. He installs AMSCO low-E 366 glazed, argon filled vinyl windows. When it comes to framing, two-by-six is more than sufficient, so long as the outside corners are "open."

"When most people think about air sealing, their mind goes to the weather stripping around the front door," he said. "This is important, but the critical areas are those that can't be accessed once construction is finished; the plumbing cutouts, framing cavities, the bottom frame-plate to the subfloor, wiring inlets and register exchanges. This is where blower door air sealing tests are won or lost."

A Different Take on Ductwork

"We're big believers in Fujitsu heat pump technology," said Danielsen. "That doesn't make us unique, but how we size and install them does."

Danielsen uses Right-Suite design software to calculate the load for each room in a house, giving him an accurate load for the whole house, but just as importantly, a load for each room, which he uses later to size and balance ductwork.

"Most design software defaults to a 1.30 modifier, automatically oversizing the capacity of the heat pump," said Danielsen. "We bring our modifier down to 1.10. I want the heat pump to run 24/7."

Danielsen explains that heat pumps - or any HVAC equipment for that matter - don't reach full efficiency until they've been running for 10 or 15 minutes. An oversized unit that constantly cycles on and off never operates at its full potential. As a result, he sizes his systems for design conditions and no more.

"Our approach to installing slim-duct systems is really just best practice, but some companies don't use the same level of detail that we do," said Danielsen. "As a result, they sacrifice efficiency."

"Our ductwork layout is always a radial design," he continued. "We run duct directly from the plenum to point of use. Legs start at the plenum, never branching off another supply. This makes balancing a breeze."

He also explained that by placing registers on interior walls and using a very short return, a natural convection current occurs. Because the systems run 24/7, the delta-T remains under 23°F, regardless of the season. As a result, air in the room doesn't stratify. Air temperature readings at the floor and ceiling show a differential of 2°F or less.

"Air should move at 400-600 CFM, generating very little friction and conductive loss," said Danielsen. "Air should move as fast as possible without creating much friction."

Finally, sealing and burying the ductwork is more important than many people think. Danielsen likes to see 100% of the ductwork

covered by insulation, but sometimes it's just not possible. They cover everything they can. Once duct sealant is applied to the entire duct system, Danielsen typically sees five percent or less duct leakage to the outside.

Got the Green Goods

None of the changes Danielsen implements are radical, but each small improvement builds on the next, adding up to substantial energy savings. That said, a tight building envelop, correctly-sized HVAC, smart ductwork design and robust insulation are only half the equation. Selecting and properly installing the correct appliances and systems is the other half.

After getting the green light from the Board at Habitat for Humanity, Danielsen had a conversation with a local solar company, Technical Specialty Solutions. They offered to donate an eight-panel, 2.76 kW solar array that was installed on the 1,250 square-foot house.

The home does not have battery storage capacity. Rather, the solar array feeds the power grid during the day, and draws from it at night. The donated solar array would nearly cover all the power used in the home.

The heat pump installed on the project is a single-zone 12,000 BTU/h Fujitsu H-Series 12LUAS1, offering up to 21.5 SEER.

"We install Fujitsu heat pumps for a variety of reasons," said Danielsen. "First, I feel like they heat extremely well. Second, if there's a problem, there's never a problem. Their tech support and warranty is the best in the business. Their local support is also outstanding."

Danielsen sources all of his heat pumps at Johnstone Supply's Stockton branch.

"Mark Whitlock, at Johnstone is absolutely brilliant," said Danielsen. "Smart, times ten to the power of eight. He's helped with small things and even big things, like designing a VRF system at a massive church. I feel lucky to be working with both Johnstone and Fujitsu."

To round out the equipment list at the Habitat pilot project, Danielsen installed a 50-gallon Ruud heat pump water heater.

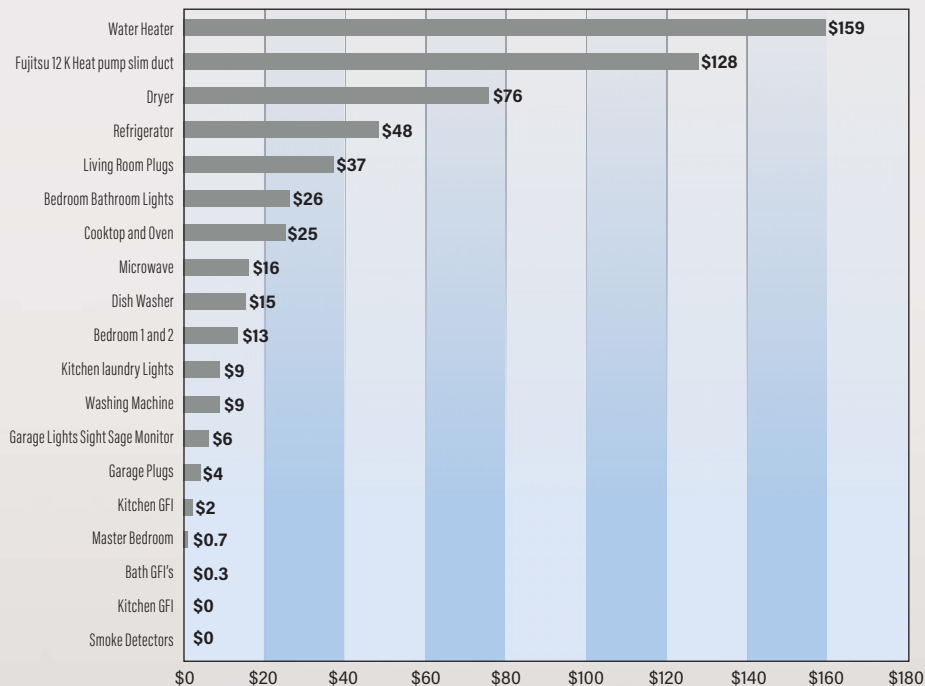
DreamTeam

Danielsen Construction and Energy Management was under the gun from the Habitat director to stay on budget. The original design for the home called for a 60,000 BTU/h gas furnace and three-ton air conditioner. Danielsen's heat pump design trimmed 50 percent from the HVAC cost, allowing more money to be invested in other areas, primarily insulation.

Over the course of the nine-month project, Danielsen worked with his team of four installers, Alejandro Rodriguez, Hamberto Espino, Will Ibarra and Jose Rodriguez. All of them have worked for Danielsen for over a decade, some nearly two decades.



The Danielsen Construction and Energy Management crew.
Tom Danielsen



Bar graph shows energy consumption of each appliance in the home. The data collection system displays power consumption from each circuit in the home. After solar generation, the Fujitsu mini-split consumed \$128 of power over the course of the year.

Tom Danielsen

The Results

Over the course of the year, the small solar array produced 4,571 kWh. Not surprisingly, the water heater consumed the most power, followed by the heat pump, the dryer, the refrigerator and so on.

“We can see that the Fujitsu system operates continuously, using between 400 and 600

Watts during the winter, and between 600 and 800 Watts in the summer,” said Danielsen. “Over the course of the year, keeping the home comfortable required a little more than double the energy it took to operate the refrigerator. That’s amazing.”

When the utility’s annual True-Up bill became available, all electric consumption in the home was portrayed in dollar values, adjusted for the power generated by the solar array. The homeowner’s annual energy expense was \$574. Domestic hot water production cost was \$159, heating and cooling accounted for \$128, and the dryer consumed \$76 worth of power.

“In the state of California, an average utility bill runs about \$375 per month,” said Danielsen. “Here in Calaveras County, with relatively hot summers and cold winters, the average home utility cost is at least that. It costs less to power this house for a year than the average home in California for two months!”

The Experiment

The energy data collected and verified by Glidden and PG&E are in line with what Danielsen has seen on most of his construction projects over the past decade.

“What I find most encouraging is that we’re not doing anything crazy here, and even if the solar array hadn’t been donated, this house would have cost roughly the same as a traditional home” said Danielsen. “There were no ultra-expensive building materials or methods used. We installed basic equipment, employed best practices and added a small photovoltaic array. In fact, if we’d have added one more panel to the array, the annual energy cost would have been less than zero, making this a true net-zero property.”

The ability to build net-zero homes at scale for roughly the same cost as ‘regular’ houses changes everything,” he continued. “It gives people the choice between buying nearly identical homes at a very similar cost, except one home will have no utility bills and a dramatically reduced environmental footprint.”

CB

Dan Vasty is a writer who covers the HVACR industry.



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Equipment Safety Considerations with A2L Refrigerants

A2Ls—with their lower flammability classification—introduces new considerations for equipment safety, system design strategies and servicing best practices

By Joe Summers

The stage is set for the adoption of A2L refrigerants in the commercial refrigeration sector. With lower-global warming potential (GWP) ratings below 300 and safety standards enabling higher refrigerant charges, A2Ls unlock a wide range of new application and equipment possibilities. For original equipment manufacturers (OEMs), system designers and service technicians, the use of A2Ls—with their lower flammability classification—introduces new considerations for equipment safety, system design strategies and servicing best practices

Required Safety Measures for A2L Equipment & System Design

The Underwriters Laboratories (UL) 60335-2-89, 2nd edition product safety standard provides guidelines for the safe use of A2L and A3 refrigerants in commercial refrigeration by specifying requirements for equipment design, construction and installation. Per the UL 2-89 standard, these requirements are defined for two equipment types: self-contained units and remote systems.

Self-contained Units

Self-contained is defined as equipment consisting of a completely factory-assembled, factory-charged and factory-tested

refrigeration system, in which all refrigerant-containing parts are permanently connected at the factory. Essentially, the evaporator, condenser and compressor are all part of a packaged unit, which is a common design strategy for reach-in display cases. Per the UL 2-89 standard, any self-contained system charged with more than 150 grams of refrigerant (the current charge limit for R-290) must follow its safe construction guidelines, which starts with its charge limit requirements. The UL 2-89 standard defines self-contained A2L charge limits based on whether the unit has a closed- or open-door (or drawer) design. Per its Annex CC construction and testing requirements, self-contained equipment charge limits are calculated as follows:

- $m1 = 8 \text{ m}^3 \times \text{LFL}$ for closed-door (or drawer) designs
- $m1 = 13 \text{ m}^3 \times \text{LFL}$ for open-door (or drawer) designs.

For example, since R-454C has an LFL of 0.291 kg/m³, the refrigerant charges in closed and open cases are as follows:

- 5.1 lbs. of R-454C in a closed case
- 8.3 lbs. of R-454C in an open case

These higher charge limits would greatly expand the cooling capacities found in current self-contained systems charged with R-290. Per the UL 2-89 standard, self-contained equipment that stays below the m1 charge and passes Annex CC testing, leak detection or additional risk mitigation is not required. Annex CC also requires OEMs to verify that their equipment will not exceed 50 percent of the refrigerant's LFL in the event of a leak.

Remote Systems

The potential for using A2L refrigerants in remote, distributed systems—such as condensing units or mini scroll packs—would enable a new generation of lower-GWP, higher-capacity solutions for commercial refrigeration stakeholders. Because remote systems are largely assembled, charged and installed in the field, they will require adherence to additional safety requirements and considerations.

Allowable charge limits are proportionate to the application size and/or cooling requirements. UL 2-89 also provides guidance on how to calculate A2L charge limits in remote and/or fielderected systems:

- $m2 = 52 \text{ m}^3 \times \text{LFL}$
- $m3 = 260 \text{ m}^3 \times \text{LFL}$

Again, using R-454C as an example, the maximum allowable charge size would be 76.2 kilograms (166 pounds) and deliver up to 50–60 HP of cooling capacity. However, utilizing larger



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charges of A2L refrigerants in remote systems may require additional safety mitigation measures. Specific charge calculations and mitigation strategies will be based on the LFL of the A2L refrigerant, the area of the installation space and other relevant application conditions.

Remote condensing unit OEMs should follow the guidance found in UL 2-89 (2nd edition), under its Annex 101.DVU and Annex 101. DVG requirements. Systems should be designed to detect, isolate and disperse A2L refrigerant leaks via a combination of tools and controls:

- Sensors within cases to detect leaks
- Isolation and/or safety shut-off valves (SSOVs) in the refrigeration system to limit releasable charge
- Electronic controls with A2L logic to perform required actions in the event of a leak—such as shutting off the compressor and/or other components
- Ventilation and/or circulation fans within cases or walk-in units.

A2L Servicing Best Practices

When serving systems with A2L (or A3) refrigerants, technicians should be aware of some new safety considerations and remember to follow refrigerant management best practices. The first step is to identify which specific refrigerant is being used by looking for refrigerant labels on the system. Look for red markings on all service fittings and be sure to clearly mark them for the next technician who may service the system.

Next, it’s important to use specific tools that are designed for A2L use, such as gauges, vacuum pumps, and leak detection and refrigerant recovery machines. Compared to the process of repairing A1 refrigerant-based systems, A2Ls require three mandatory steps that are already considered industry-accepted best practices:

1. Purge with nitrogen.
2. Evacuate the refrigerant.
3. Perform leak and pressure tests.

With A2Ls, it’s important to work in a well-ventilated area and deploy a continuous leak monitoring and detection system while servicing.

Finally, service technicians need to understand that legacy A1 refrigeration systems cannot be retrofitted for use with

A2L refrigerants. Componentry, material compatibility and a variety of other construction factors must be taken into consideration. As such, make sure that all new A2L installations or remodels use A2L-qualified equipment. For more information about the safe application of A2L refrigerants, please visit the E360 content hub.

To learn more about the latest regulations impacting A2L adoption in U.S. commercial refrigeration, please visit the regulations page on our website, **Copeland.com. CB**

Joe Summers is senior product manager for Copeland.

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g. Copies not Distributed	494	553
h. Total (Sum of 15f and g)	30,928	30,884
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c. Total Requested Copy Distribution (Line 15f) + Requested/Paid Electronic Copies (Line 16a)	34,272	34,833
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17. Publication of Statement of Ownership for a Requester Publication is required and will be printed in the:	issue of this publication.	Oct-23
18	James Marinaccio, Audience Development Manager	Date 9/19/23
I certify that all information furnished on this form is true and complete. I understand that anyone who furnishes false or misleading information on this form or who omits material or information requested on the form may be subject to criminal sanctions (including fines and imprisonment) and/or civil sanctions (including civil penalties).		

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Anyone who wanted me to look over their system was having issues with it.

Can You Hear Me Knocking?

Here are two self-generated techniques that I've done in 37 states in all kinds of neighborhoods, from high-end homes to high-crime areas, to generate both service and replacement sales. They involve knocking on the doors of strangers, so you'd be advised to make sure that's legal in your market area.

Service/Replacement Sales:

I've done this in areas where we weren't doing any work (Sundays were great days). I'd knock on a door. Once the homeowner could see me, I'd take a step back. When they opened the door, I'd hold out my company ID and say, "Hello. I'm with an air conditioning and heating company. We're working up the street at (Customer's Name) house. While I'm in the neighborhood, I'm just offering to do a quick visual inspection of everyone's heating and cooling system for free. It's short, it's non-invasive, and I'm also in a position to answer any questions you might have about your home's heating and cooling system."

That's it! The whole thing took less than a minute and I've got 100 doors I can knock on, so there is absolutely no stress or nervousness on my part. They either want to talk to me or they don't. It almost doesn't make any difference to me.

Having said that, you wouldn't believe how receptive people were to the concept. Most people wanted me to look at their equipment. We usually started at the condensing unit, where I'd record the make, model, and serial number.

It didn't take long for me to realize that anyone who wanted me to look over their system was having issues with it. It might not be cooling properly, they might have a room that doesn't heat or cool properly, they might have been having service or reliability issues.

Just about everyone's HVAC needs maintenance ... badly. I'd point that out in a nonchalant way. They'd ask how much that costs, and I'd frequently get them on service agreement on-the-spot.

We'd usually head inside to look at their heating equipment, and it usually looked as bad as the their condensing unit. If they were in a cold climate and didn't have a humidifier, we'd talk about that.

When I looked inside a furnace, I might ask, "Anybody here get sick a lot or have a lot of sinus issues?" Most households have at least one person with chronic sinus trouble, and it's frequently the entire family. I'd tell them, "I can see why." We'd talk about the necessity of keeping it clean and what was available in Indoor Air Quality.

It was very common for people to ask, "How much is a new one?" I carried my equipment pricing with me, and I'd just open it up and show them their options. Usually, there was no sales pitch or anything.

Sometimes they bought new equipment right on the spot, but more often than not, they did get the service agreement. That meant a technician would go out there to see this customer who was already having issues, already had a relationship with me, and already knew my prices. All it took was for the tech to recommend replacing the equipment before sinking any more money into it for them to want me back out there to formalize the paperwork.

Whether they bought the service agreement or not, I always left them with a few handy promotional items, such as shopping lists and/or pot holders, and made it a positive experience. There were times when people I'd met a year prior just to happened to call the shop while I was there making a follow-up visit.

Not only did this technique pay off financially, it was fun and, since I was parking my car and just walking for the next few hours, I was working very efficiently.

To be clear, I did not spend all day, even an hour, in any one home. If we did everything I mentioned in the paragraphs above, I was in and out of there in about 20 minutes.

This also works quite well in commercial. The very first time I tried this in commercial, I "accidentally" sold a walk-in cooler.

Add-on Air Conditioning:

Even today, there are plenty of homeowners living without central air conditioning. Why, in this day and age, would anyone in a warm climate not have central air conditioning? Can I tell you? It's because they don't know how affordable it is. They don't know that they can usually get it installed with no down payment, often even a delay on when their first payment starts, and that whatever they pay to add central air conditioning will automatically add to the value of the home, so they'll get all their money back when they sell the home.

I sold "add-on" air conditioning door-to-door. I traveled the country and did this just about everywhere I went for several years. I have witnesses.

For this technique, I looked for what I call "upper lower-class" neighborhoods. I'd approach any home that had two things:

1. At least one window air conditioner
2. A newer car.

I'd carry a clipboard, a tape measure, and a flashlight.

When someone answered my knock on the door, I'd hold out my company ID and say, "I hope I'm not bothering you. I'm with an air conditioning company."

"I'm just letting people know that I've arranged for financing for anyone in this neighborhood who wants to add central air conditioning with no down payment and just about any size payment you want."

"It takes me about five minutes to measure your home from the outside. Then I can at least give you a rough idea of what your payment would be. If it sounds like something you'd like to pursue, I'll step inside, and work out the details with you."

"Would you like me to take the five minutes to measure your home and at least let you know what it would take to get rid of those old window shakers, that anyone could just rip out and climb right in, and get you some nice high-efficiency air conditioning?"

The first day I did this was a Sunday, and I sold \$30,000. I turned in the paperwork on Monday and every one of those sales was rejected due to poor credit. However, I wrote \$29,000 on Monday, and every bit of that was accepted.

I usually had to replace the furnace and improve or replace the ductwork to make the air conditioning run properly.

Most of the homes required an upgraded electrical service to at least 100 amps. I partnered with electrical service contractors to subcontract that out, and made additional money on that.

I also partnered with insulation companies and subcontracted that out, and of course, made money on that as well. **CB**

Charlie Greer was voted Favorite Industry Sales Trainer and HVAC Consultant-of-the-Year. He's also a member of the Contracting Business HVAC Hall of Fame. For info on Charlie's services, go to www.hvacprofitboosters.com. Email your comments on this column or your sales questions to charlie@charliegreer.com.

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"Nothing replaces the knowledge your people will get through good training and deep understanding of their measurements."

Your Next Secret Weapon?

For as long as I can remember, HVAC contractors have searched for a silver bullet to catapult them into double-digit profits and help grow their business so they can someday cash in and retire comfortably. While this remains the dream of many entrepreneurs today in our industry, there are no easy silver bullets.

On the positive side, there are things you can do to achieve these goals, including building a large service agreement base and improving your business processes to maximize efficiency and profitability.

But what if I told you there was a secret weapon that, while not quite a silver bullet, could significantly increase your sales and profitability while turning customers into raving fans?

What if you had a product that almost every customer needs and few contractors are aware of or even know how to deliver? What if this product could significantly improve your customers' homes' safety, comfort, health, and energy efficiency?

What if you could sell this product as a stand-alone solution for your service customers or add it to virtually every new replacement? What if this product had very low material costs but could yield higher double-digit net profits than anything you have to sell? Curious?

Well, not only does this product exist, but the best part is you can manufacture and install it. You also have complete control over its quality and can price it for what it's worth. This incredible product is called an **Air Upgrade**.

What's an Air Upgrade and How Does it Work?

Put simply, an Air Upgrade involves testing a system's performance and improving the air distribution system so equipment can operate within the manufacturer's specifications for delivered airflow and system capacity.

In other words, it allows a three-ton system to deliver roughly 1200 CFM of airflow and 36,000 BTUs instead of the typical 800 CFM and 24,000 BTUs of the average installed system.

It all starts with testing static pressures and airflows at the equipment. Once your field people take some simple measurements, they can determine if an Air Upgrade is needed—which is roughly 80% of the time.

With today's ultra-sensitive equipment, including an Air Upgrade on your installations significantly increases the chances that it will work as promised and dramatically reduce callbacks.

Many contractors who have learned this process typically sell Air Upgrades on a flat rate basis.

While pricing will vary based on labor and material costs, you can sell the typical upgrade for \$2,000 to \$3,000—or more.

To successfully integrate Air Upgrades into your business, you need three key elements:

The **first is the right mindset**. Your team will need to think differently about the right solutions for customers. You should base your recommendations on knowledge and data from testing and diagnostics. No more guessing!

The **second element is training**. While there are better diagnostic tools and software than ever on the market, nothing replaces the knowledge your people obtain through good training, a deep understanding of their measurements, and how to remedy the shortcomings of an HVAC system.

The **third element is having the right tools**. I can't tell you how often I see contractors send their techs to training and not equip them with the right tools to do the job. That's like training a firefighter on state-of-the-art equipment and sending them out with a fire extinguisher. To profitably deliver Air Upgrades that will turn your customers into raving fans, you must invest in high-quality test instruments and software.

How to Sell Air Upgrades

1. During a service and/or maintenance call. With the proper training to test and share the results with customers, your techs will generate a ton of Air Upgrades.

2. On a replacement call. With some technical training and a slightly different approach that involves your customer in the process, this product can be added to virtually every replacement sale, at net margins easily twice those of the equipment installation.

While this article just scratches the surface, great information is available on testing and delivering Air Upgrades. Remember, Air Upgrades are not a silver bullet. They are a product that requires true commitment and investment of your team's time as well as your company's resources. There is a learning curve, which can be shortened with good training and coaching, but the rewards can be truly spectacular! **CB**

Dominick Guarino is President & CEO of National Comfort Institute (NCI) (www.nationalcomfortinstitute.com), the nation's premier High-Performance training, certification, and membership organization. NCI focuses on improving consumer safety, comfort, health, saving energy, and helping contractors grow and become more profitable. His e-mail is domg@ncihvac.com.

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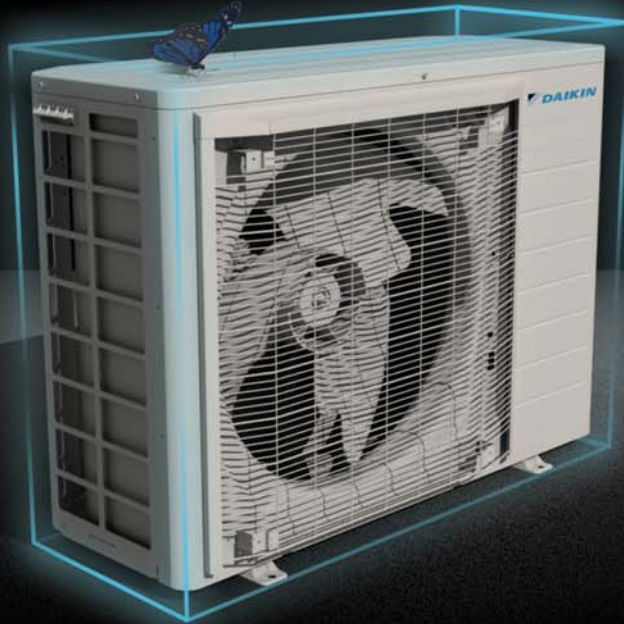


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ADDITIONAL INFORMATION

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